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MAKING ADAPTIVE REUSE A REALITY:

TRANSITIONING YOUR BUILDINGS FOR FUTURE GENERATIONS

Buildings are responsible for nearly 40% of global CO_2 emissions, 80% of which will still be in use by 2050. Infusing new life into existing buildings that were not constructed with sustainability in mind is a top concern today, and adaptive reuse is a crucial element of that.

According to the American Institute of Architects,

RENOVATION & ADAPTIVE REUSE

projects typically produce between

50 TO 75% LESS EMBODIED CARBON

than new structures, particularly when the existing foundations and structural elements are preserved.*

*This AIA statistic does not take into account the embodied carbon of the original building. Embodied carbon represents the full life cycle of the materials from production through disposal.

Adaptive reuse – the process of retrofitting existing building systems to improve energy efficiency and meet decarbonization targets

– requires many things be taken into consideration, including the size and type of the building, location, regulatory permits and current building condition and performance. However, the specific application and motivation behind such projects will often dictate the approach.

For instance, perhaps a building is being modified from an old warehouse into high-end apartments. This will require factoring in how the HVAC system will disseminate heating and cooling in a range of configurations, while converting an old shopping mall into an office space may encounter physical limitations that need to be overcome.

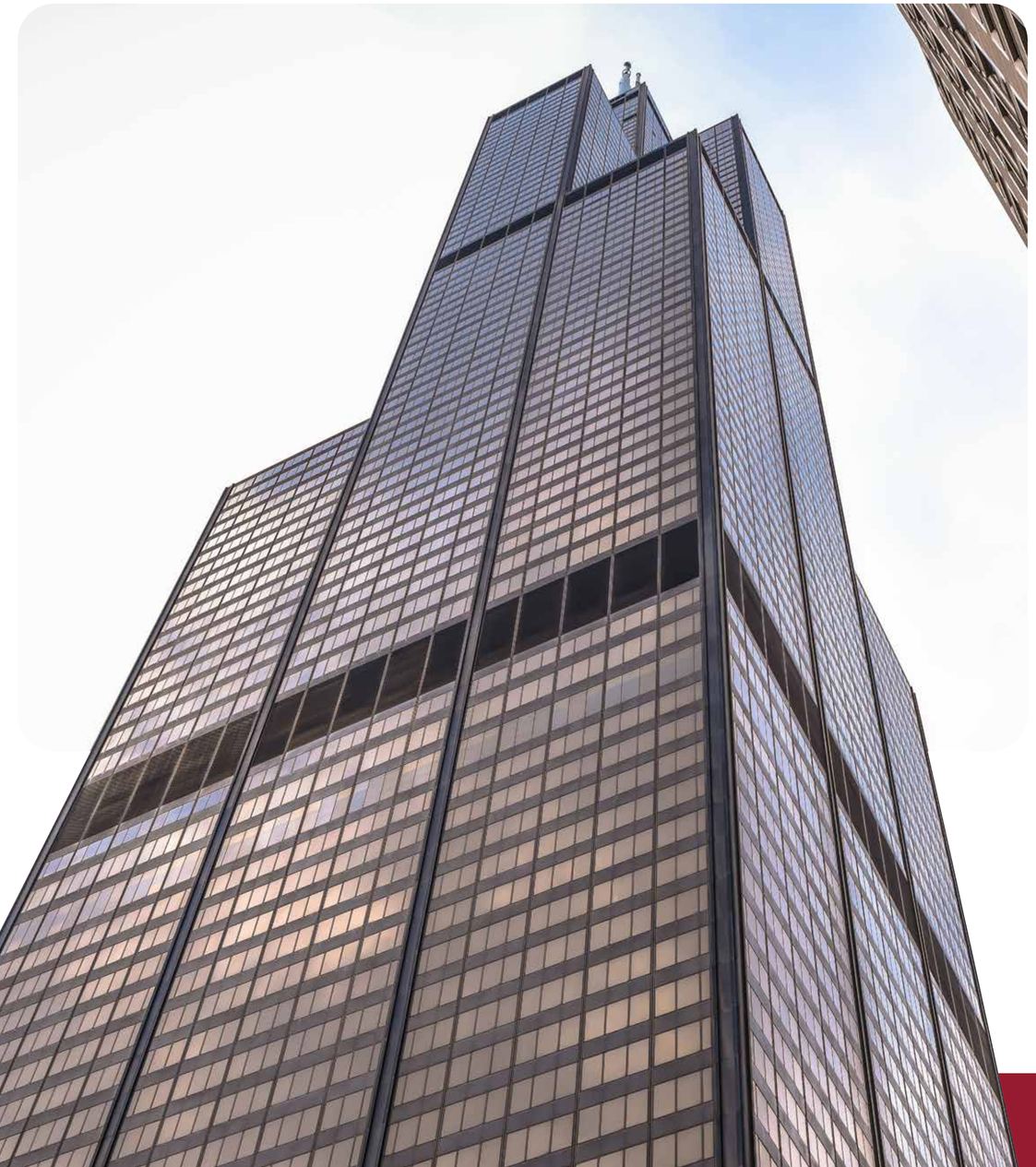
Let's consider two scenarios that dictate vastly different approaches to modifying the structure beyond its original intended use. →

SCENARIO A:

When the Building Usage Isn’t Changing

Energy in the built environment means more than just transitioning to renewable sources; it’s about adopting a clean energy approach to every aspect of consumption – from storage capabilities to demand to production. In instances where the building usage isn’t changing in an adaptive reuse project, changing out the energy source and reusing the majority of the existing hydronic system may be the most economical solution.

Examples of alternative energy sources include water-based systems like hydronic, which are an ideal transmitter of energy around a building, renewable energy systems and smart control upgrades.



SCENARIO B:

When Building Reuse Projects Change HVAC Application Demands

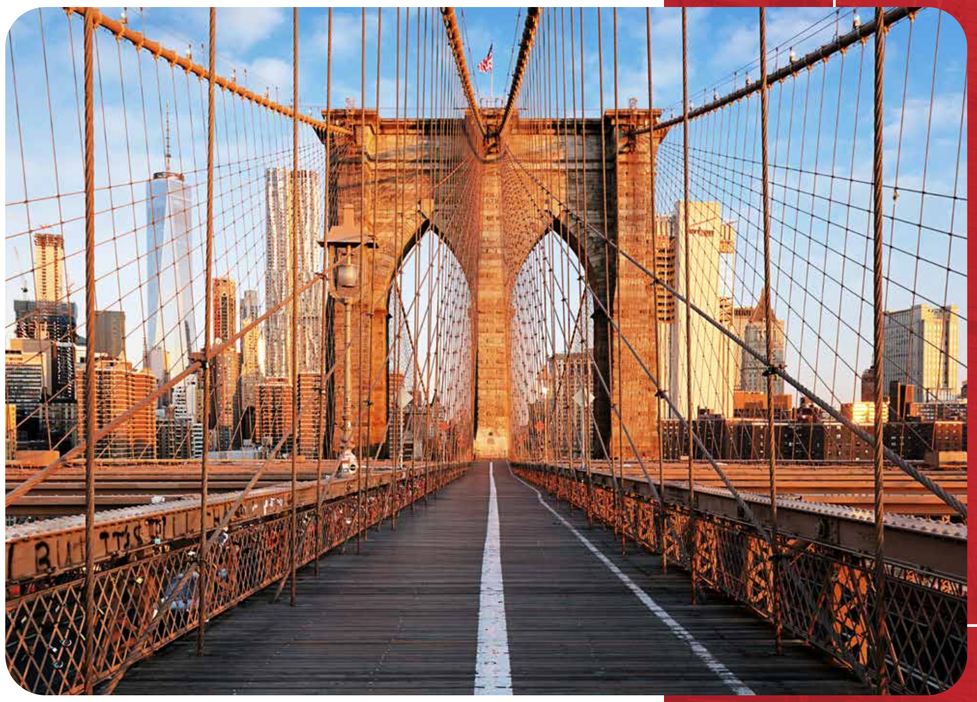
Some building reuse projects – like renovative adaptive design – involve rebuilding, refurbishing or repurposing the interior of a building for a completely different purpose. Depending on the purpose and the number of occupants the new building will accommodate, this may require different component upgrades and technology.

For instance, switching to Electronically Commutated Motors (ECM) provides a much higher level of precision and control, particularly across a wide motor load and higher torque.

With preprogrammed modules including the motor, impeller and balancing valves, these are designed to save energy, reduce costs and seamlessly integrate with other systems.

CASE STUDY

HOUSING DEVELOPMENT GETS HIGH-EFFICIENCY HYDRONIC RETROFIT



When the Twin Parks housing development in the central Bronx was first completed in the early 1970s, it was hailed internationally for its architectural innovation and promise of urban renewal.

Now, 40 years later, buildings in the complex are being updated one by one and Twin Parks is again being recognized at the highest levels for innovation, this time for its focus on energy efficiency.

The first phase of the multi-phase project involved heating systems, during which the decision was made to switch the existing electric heating system to a high-efficiency hydronic system. Bell & Gossett representative Wallace Eannace Associates, Inc. worked with contractor Platinum Energy Group on large system upgrades to seven Twin Parks apartment buildings, retrofitting boiler rooms with new equipment.

Integral to the inside-out retrofit were Bell & Gossett's Series 80 ITSC vertical inline pumps, which combine sensorless technology with the energy savings of variable flow.

According to the U.S. EPA,

MORE THAN 90% OF CONSTRUCTION DEBRIS

is produced by demolition of existing buildings, making

ADAPTIVE REUSE STRATEGIES

all the more vital to reducing waste.

Overcoming Challenges and Limitations of Adaptive Reuse Projects

Regardless of the building type or planned use, adaptive reuse projects are complex, and the success of such projects hinges on extensive assessment and coordination, as well as the technical expertise for full scale execution.

Technology – smart pump technology, specifically – is playing an important role in these pursuits. Smart pump systems like Bell & Gossett's hydrovar® X-enabled motors offer real-time connectivity and integration with BMS, which can be compatible or implemented in virtually any building, regardless of legacy components, size or age. The prepackaged nature of systems like these are compact, maximizing usable space and allowing smooth system integration.

CASE STUDY

VAIL HEALTH HOSPITAL GETS STATE-OF-THE-ART CENTRAL UTILITY PLANT

Widely regarded as one of the world's most advanced mountain hospitals, Vail Health Hospital in Colorado recently underwent a five-year, $190 million expansion. The mountain terrain, along with the need to keep patients comfortable and vital hospital services running, presented logistical challenges throughout construction.

To ensure uninterrupted hospital operation, contractors alternated between demolishing the old chiller pumps and running new piping to install new Bell & Gossett pumps. Crews demolished one of two existing chiller pumps, then ran the new chilled water lines up to the roof and installed the new chiller before removing the rest of the former chilled water system.

The project, completed in 2020 alongside Bell & Gossett representative Blackmore and Glunt - Rockies, included a new central utility plant in the facility's new east wing, which features 12 Bell & Gossett pumps, including Series e-1510 and Series e-80 pumps for chilled water, heating, snow melt and domestic water recirculation.

Adaptive Reuse in Action

Across the United States, adaptive reuse projects are underway – with many standards, municipalities and business districts seeking to advance this development in their own ways. For instance, a new Washington D.C. tax abatement program provides a 20-year tax abatement upon the issuance of the certificate of occupancy for property owners to convert all or a portion of their property to residential uses – promoting greener usage, less waste and historic preservation.

Guidelines from organizations like ASHRAE and the U.S. Green Building Council further support this transition to building reuse and adaptive reuse.

"Green buildings are typically thought of as ones newly built, but many historic buildings can be just as sustainable if they are properly maintained and operated," according to a USGBC blog post.

WHILE ADAPTIVE REUSE MAY NOT ALWAYS BE FEASIBLE, IT IS ALMOST ALWAYS THE PREFERRED METHOD.

Whether it's a structural retrofit or a complete overhaul of the building itself, adaptive reuse presents cost efficiencies and green design.

To learn more about adaptive reuse in the built environment, look out for our new white paper on adaptive reuse launching in October.

LEARN MORE | >

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BUILDINGBETTER
FUTURES